

## Intel® Core™ 2 Duo Processor, Dual PMC



### APPLICATIONS

The PP 452/03x is a PC-compatible, high functionality, dual PMC, single XMC (PCI Express™ Mezzanine Card), CompactPCI® board supporting the Intel® Core™ 2 Duo processor and the Intel® E7520 server class chipset. The processor contains two CPU cores and shared L2 cache. The PP 452/03x features 4 Gbytes DDR2 ECC SDRAM, an optional on-board hard disk drive, CompactFlash™, onboard Flash drive and a variety of I/O interfaces. The board will operate in a system slot, a peripheral slot or

independently from the CompactPCI bus. Supporting two Gigabit Ethernet ports, the board is compliant to the PICMG® 2.16 specification. Full system monitoring is provided by the PICMG 2.9 compliant IPMI interface. The PP 452/03x is suitable for demanding applications within the defense, industrial control, telemetry, transportation, and aerospace markets. To simplify the board's integration many popular standard operating systems are supported.

### HIGHLIGHTS

- 1.5 GHz Intel® Core™ 2 Duo processor:
  - 667 MHz Front Side Bus
  - 4 Mbytes L2 cache
  - Intel® 64 Technology (64-bit computing support)
- 4 Gbytes of dual channel DDR2-400 ECC SDRAM
- 1 x PMC/XMC site and 1 x PMC site, both with front and rear user I/O:
  - both PMC sites support 32/64-bit; 33/66MHz PCI-X
  - XMC site supports up to x8 PCI Express™
- 2 x SATA150 interfaces via rear
- EIDE onboard mass storage interfaces:
  - onboard soldered Flash drive
  - option for removable CompactFlash® carrier or 2.5" ATA Hard Disk Drive
- 3 x Universal Serial Bus (USB 2.0) interfaces
- 2 x 10/100/1000Mbps Ethernet interfaces:
  - Dual Gigabit Packet Switching Backplane (PICMG 2.16)
- 1 x RS232 serial channel interface
- Watchdog timer and Long Duration Timer
- IPMI (Intelligent Platform Management Interface)
- PICMG 2.9 (System Management Specification)
- CompactPCI controller:
  - operates in system slot or peripheral slot
  - 32/64-bit at 33/66 MHz CompactPCI interface
- Option to bypass CompactPCI bus (Satellite Mode)
- Single slot (for all option combinations)
- Extended temperature versions available:
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series, includes humidity sealant)
- Ruggedized conduction-cooled version (RC-Series) available:
  - conduction-cooled to ANSI/VITA 30.1-2002
  - -40°C to +85°C, conformally coated
  - see separate PP 452/03x-RC datasheet
- Ruggedized air-cooled version (RA-Series) planned:
  - -40°C to +75°C, conformally coated
  - see separate PP 452/03x-RA datasheet
- Ruggedized versions support a removable Flash drive
- Support for Linux®, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® 2000, QNX®, Solaris™ and VxWorks®

## Central Processor

- 1.5 GHz Intel® Core™ 2 Duo processor L740:-
  - dual-core processor
  - 4 Mbytes of secondary (L2) on-die cache
  - 667 MHz Front Side Bus
- Intel® 64 Technology (64-bit computing)
- uses FC-BGA 478 (micro Flip-Chip Ball Grid Array) package
- utilizes Intel® E7520 server class chipset:-
  - uses Intel® 6300ESB I/O Controller Hub
- provision for XDP debug port

## SDRAM

- supports 4 Gbytes DDR2-400 ECC SDRAM:-
  - 4 Gbytes soldered on-board
  - up to four bit error correction
  - peak bandwidth of 6.4 Gbytes/s
  - dual channel architecture
- accessible from processor and CompactPCI bus

## Mass Storage Interfaces

- 2 x SATA-150 interfaces via J5
- primary channel EIDE interface supports:-
  - 4 Gbytes on-board Flash drive
  - ruggedized versions also support an optional removable Flash drive
- secondary channel EIDE interface supports:-
  - option for removable dual CompactFlash™ carrier or 2.5" ATA100 hard disk drive
  - option uses PMC site 1

## Ethernet Interfaces

- 2 x rear interfaces implemented by Intel® 82574L controllers via x1 PCI Express™ links:-
  - support for PICMG 2.16 R1.0 - Packet Switching Backplane (PSB)
- supports 10 Base-T, 100 Base-TX, 1000 Base-T

## PMC/XMC Interfaces

- 1 x PMC/XMC site and 1 x PMC site
- common features for both PMC sites:-
  - 32/64-bit, 33/66 MHz PCI/PCI-X operation
  - 3.3V or 5V PCI signaling levels
  - PMC connectors used for rear I/O
  - Front panel I/O available
- XMC (PCI Express™ Mezzanine Card) site interface supported via x8 PCI Express link

## Serial Interface

- 1 x RS232 serial channel:-
  - Tx, Rx, RI, CTS, RTS, DSR, DTR and DCD signals via J5
- 16550 compatible UART

## Flash EPROM

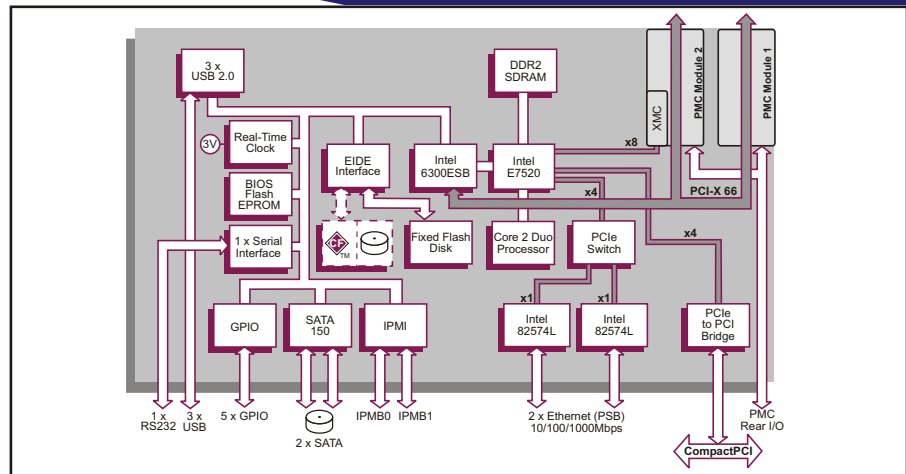
- 1 Mbyte of BIOS Flash EPROM - 8-bits wide

## Firmware Support

- Phoenix® Server BIOS
- comprehensive Power-On Self-Test (POST)
- LAN boot firmware included

## Software Support

- support for Linux®, Windows® XP, Windows® XP Embedded, Windows® Server 2003, Windows® 2000, QNX®, Solaris™ and VxWorks®



## Other Peripheral Interfaces

- PC Real Time Clock (Year 2000 compliant)
- watchdog timer
- 1 x 32-bit Long Duration Timer with processor interrupt capability
- CPU temperature monitor; voltages monitor; optional system fan monitor :-
  - accessible via IPMI
- GPIO signals via J5, two configuration options depending on which AD PP5/004 RTM used:-
  - 5 GPIO signals or
  - 3 GPIO signals and legacy multiplexed I/O signaling e.g. system fan monitor, Ethernet status LEDs on RTM
- 3 x USB 2.0 interfaces accessed via J5
- independent legacy speaker output via J3

## CompactPCI Interface

- compliant with PICMG 2.0 R3.0; 3.3V or 5V signaling levels (universal signaling support)
- 33/66 MHz, 32/64-bit interface accessed via J1/J2 connectors
- PCI Express to PCI bridge for off-board accesses
- J4 connector not fitted
- PICMG 2.1 R2.0 Hot Swap compliant
- operates as a System Slot controller or in a Peripheral slot
- option to disable CompactPCI interface (Satellite Mode):-
  - receives power from CompactPCI bus
  - board can be hot swapped

## IPMI

- PICMG 2.9 R1.5 (System Management Spec.):-
  - implements the IPMB0 interface
  - implements an IPMB1 interface
- on-board Baseboard Management Controller
- supports 8 Kbytes of non-volatile memory

## Electrical Specification

- +5V@3.1A (typical at 1.5 GHz with 4 Gbytes DRAM); +5% / -3%
- +3.3V@5.5A; +5% / -3%
- +12V@0.01A; -12V@0.001A
- +12V and -12V routed to PMC slots

## Safety

- PCB (PWB) manufactured with flammability rating of 94V-0

## Environmental Specification

- operating temperatures:-
  - 0°C to +55°C (N-Series)
  - -25°C to +70°C (E-Series)
  - -40°C to +85°C (K-Series)
- storage temperature: -40°C to +85°C
- 5% to 95% Relative Humidity, non condensing (operating or storage):-
  - K-Series includes humidity sealant
- ruggedized versions - see separate datasheets:-
  - rear plug compatible
  - conduction-cooled: PP 452/03x-RC (available)
  - air-cooled: PP 452/03x-RA (planned)

## Mechanical Specification

- 6U form-factor: 9.2inches x 6.3inches (233mm x 160mm)
- single-slot: 0.8inches (20.3mm)
- connectors: IEC-1076-4-101 for J1-J5
- shock: 20g, 11ms, ½ sine (operating); 30g, 11ms, ½ sine (non-operating)
- vibration: 5Hz-2000Hz at 2g, 0.38mm peak displacement (operating); 5Hz-2000Hz at 5g, 0.76mm peak displacement (non-operating)

## ORDERING INFORMATION

**Order Number**      **Product Description (Hardware)**  
 PP 452/031-xy      1.5 GHz Core 2 Duo Processor L7400 SBC

**Replace the order number suffix (xy) with selections from the following:**  
**where x =**  
 1 - Ethernet via rear panel  
 2 - Ethernet via PICMG 2.16  
**where y = memory size**  
 2 - reserved  
 3 - 4 Gbytes

AD PP5/003-30      RTM I/O: PMC 1, XMC 2 via 2 x PIM sites, Ethernet, SATA, USB, RS232  
 AD PP5/004-10      RTM I/O: Dual PMC rear I/O via 2 x 68way, Ethernet, SATA, USB, RS232, 5 x GPIO  
 AD PP5/004-20      RTM I/O: Dual PMC rear I/O via 2 x 68way, Ethernet, SATA, USB, RS232, 3 x GPIO and legacy multiplexed I/O signaling e.g. PP 412/03x  
 CB 26D/124-10      Cable to provide RS232, VGA (VGA not used) and two USB connectors (can be used with the AD PP5/004-10 RTM)

AD 200/001-zz      Dual CompactFlash Carrier  
 AD 200/002-zz      Dual CompactFlash Carrier (option for ruggedized and option for CompactFlash site via Front Panel)  
 AD CP1/DR1-zz      2.5 inch EIDE Hard Disk Drive assembly (contact local sales office for disk capacity)

For zz options, extended temperature E and K-Series, or ruggedized RA and RC-Series, please contact your local sales office